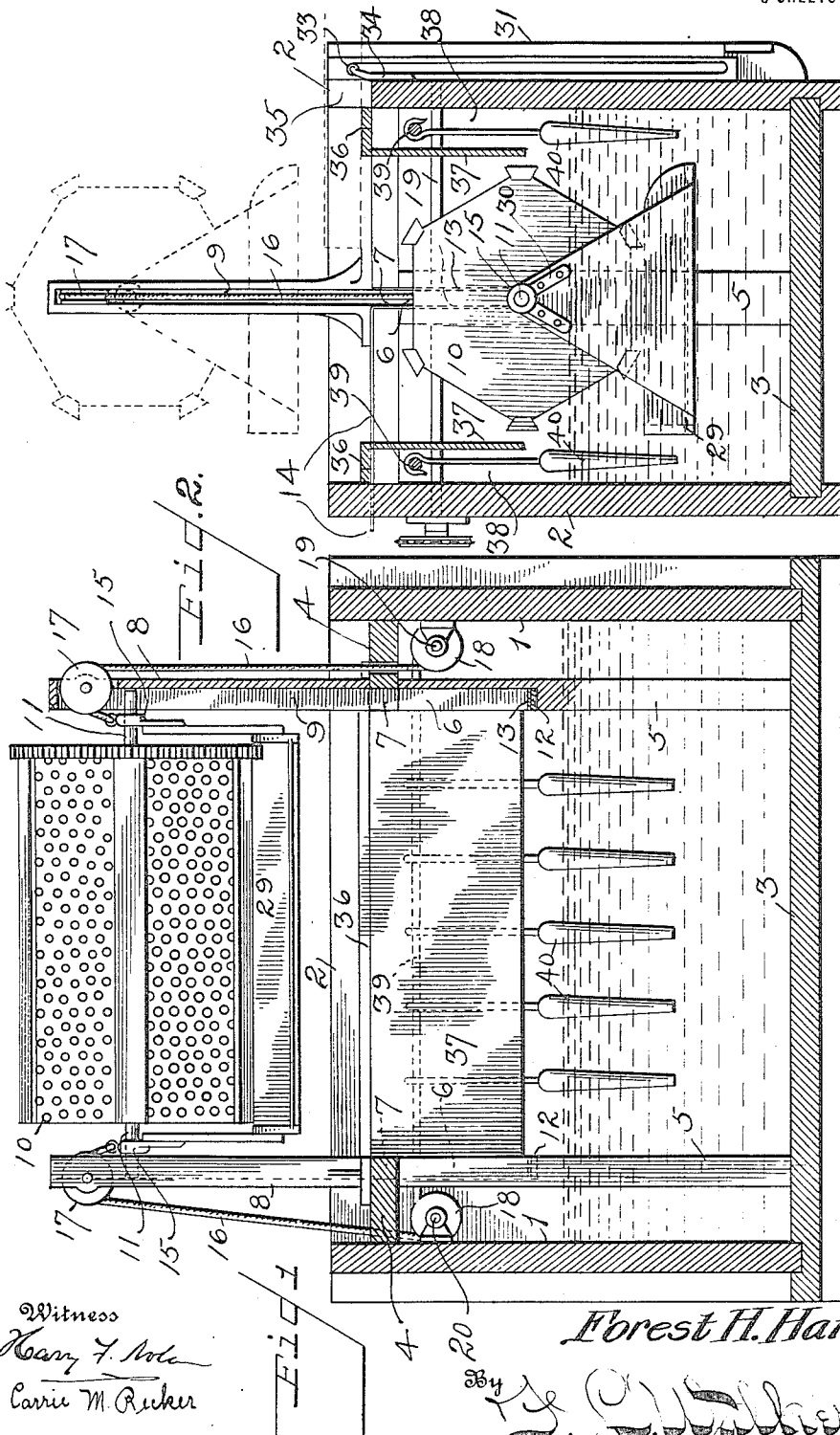


1,276,649.

F. H. HARTZELL.
ELECTROPLATING APPARATUS.
APPLICATION FILED APR. 18. 1916.

Patented Aug. 20, 1918.
3 SHEETS—SHEET 1.



Inventor

Forest H. Hartzell,

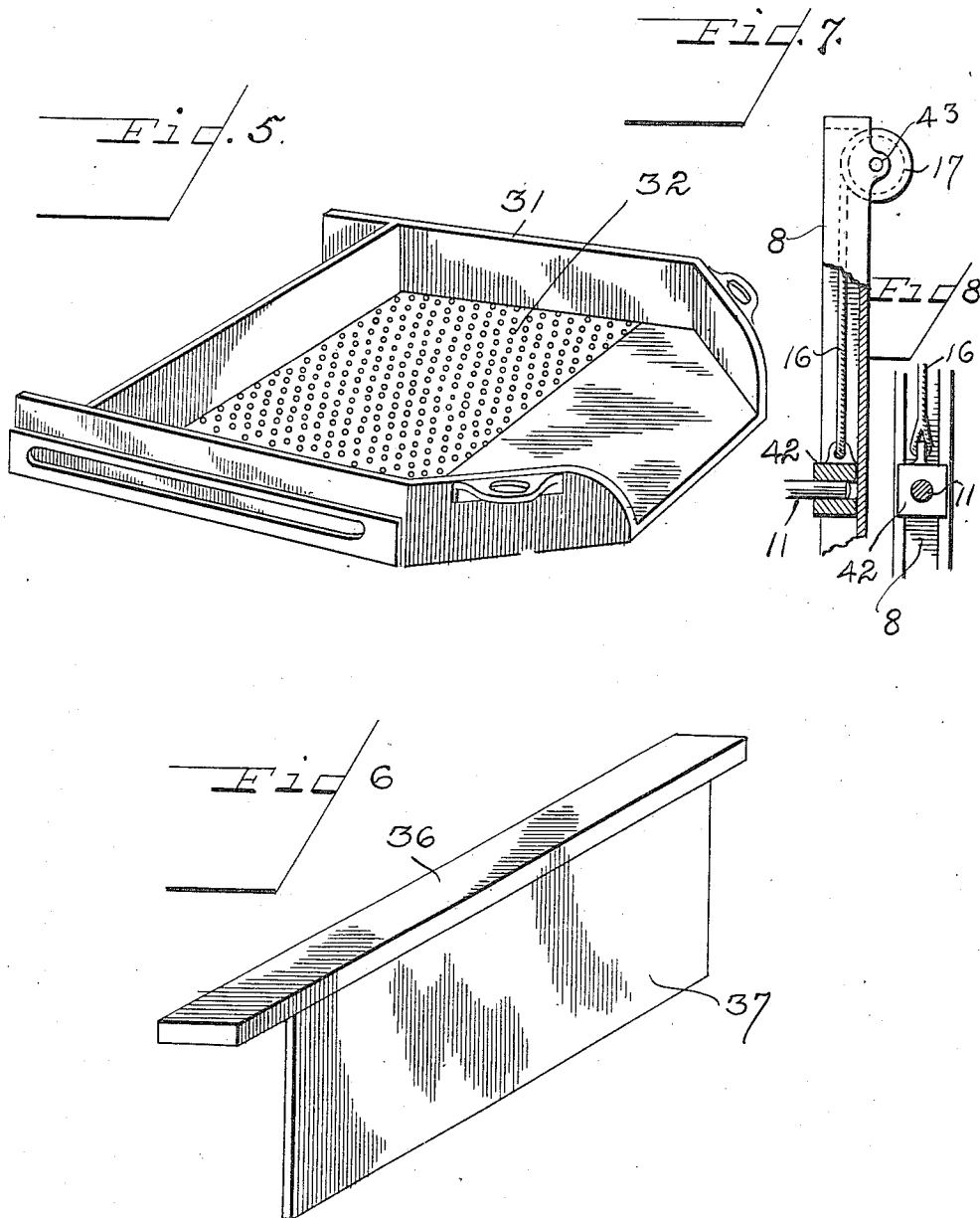
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UNITED STATES PATENT OFFICE.

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OF THE CROWN HARDWARE MANUFACTURING CO.

ELECTROPLATING APPARATUS.

1,276,649.

Specification of Letters Patent.

Patented Aug. 20, 1918.

Continuation of application Serial No. 68,472, filed December 24, 1915. This application filed April 18, 1916.
Serial No. 92,006.

To all whom it may concern:

Be it known that I, FOREST H. HARTZELL, citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Electroplating Apparatus, of which the following is a specification.

My invention relates to electroplating apparatus and is an amplification and continuation of the invention disclosed in my co-pending application, Serial No. 68472, filed December 24th, 1915.

The present invention relates primarily to the construction of the vat or tank and to means for facilitating the discharge of the contents of the cylinder or drum.

The object of the invention is to simplify the structure as well as the means and mode of operation of such devices whereby they will not only be cheapened in construction, but will be more efficient in use, convenient in operation, economical, and unlikely to get out of repair.

A further object of the invention is to provide improved hoisting apparatus for elevating the drum or cylinder from the tank and lowering it thereinto.

A further object of the invention is to provide improved means for recovering from the tank parts or articles accidentally lost from the cylinder or drum and to provide improved means for discharging the contents of the drum or cylinder.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation or their equivalents, as hereinafter described and set forth in the claims.

Referring to the drawings, Figure 1 is a longitudinal sectional view of the assembled apparatus with the drum elevated. Fig. 2 is a transverse sectional view showing the drum or cylinder in its lowered or operative position. Fig. 3 is a top plan view of the assembled apparatus. Fig. 4 is a transverse sectional view showing the apparatus in discharging position. Fig. 5 is a perspective view of the receiving tray. Fig. 6 is a perspective view of one of the splash boards.

Figs. 7 and 8 illustrate a modification of the hoisting connection.

Like parts are indicated by similar characters of reference throughout the several views.

In constructing the apparatus there is employed a vat or tank comprising end walls 1—1, side walls 2—2 and a bottom 3 of any suitable material and connected in any suitable or convenient manner.

Located within the vat or tank at the opposite ends thereof and adjacent to the top edge are shelves or ledges 4—4 extending transversely across the tank and rigidly connected with the side walls and ends thereof. Located within the tank or vat and beneath the shelves or ledges 4 are upright struts or posts 5—5 having in their inner or adjacent faces grooves or recesses 6. The shelves or ledges 4 are notched or recessed at 7—7 to register with the grooves or recesses 6 while rigidly secured to the upper side of said shelves or ledges are standards or uprights 8—8 having in their adjacent faces grooves or recesses 9 registering with the notches 7 and forming continuations of the grooves 6.

The cylinder or drum 10 may be of any suitable or convenient construction. In the drawing there has been shown a cylinder or drum similar to that disclosed in my co-pending application before referred to. It is to be understood, however, that this particular form of drum or cylinder is not essential to the present construction. Inasmuch as the cylinder or drum and its driving connection form no part of the present invention, *per se*, and the preferred form thereof being shown and described in my co-pending application before mentioned, to which reference is here made for detailed description, the drum and its driving connection will not be herein described.

The drum or cylinder 10 is provided with oppositely disposed trunnions 11 which project within the grooves or recesses 6—7—9 in which they slide as the cylinder or drum is raised or lowered. When the cylinder or drum is in its lowermost or operative position the trunnions 11 rest in the lower ends of the slots or grooves 6 which are preferably reinforced by bearing blocks 12. In order to afford convenient electrical connec-

tion with the cylinder or drum when in operative position, one of the grooves or recesses 6 is lined with a strip 13 of electrically conductive material which is extended laterally beyond the vat as at 14 for connection with the source of electrical energy.

Engaged upon each of the trunnions 11 at each end of the cylinder or drum 10 is a collar or stirrup 15 to which are attached cables 16 which pass over pulley wheels or sheaves 17 located in the top of the standards or uprights 8 and thence pass downward to winding drums or wheels 18 mounted upon transverse shafts 19 and 20. The shaft 19 passes entirely through the vat or tank and carries at its forward end a crank or handle 21 adjacent to which is mounted a ratchet wheel 22 engaged by a retaining pawl 23 pivoted to the side of the tank. The pawl by its engagement with the ratchet wheel 22 serves to retain the winding drums or wheels 18 and thereby the cables 16 in their adjusted positions. At its rearward end the shaft 19 carries a sprocket wheel 24 connected by a chain 25 with a second sprocket wheel 26 mounted upon the shaft 20 at the opposite end of the tank or vat. By this means the rotation of the shaft 19 through the medium of the crank or handle 21 will drive the shaft 20 and winding drum or wheel 18 carried thereby in unison with the shaft 19 and its corresponding winding drum. As shown in Fig. 1, the cables 16 are connected to corresponding sides of the winding drums or wheels 18 whereby the cables will be shortened in unison thereby lifting the drum or cylinder from the vat. The drum or cylinder is guided in its rising movement by the engagement of the trunnions 11 in the grooves or recesses 6, 7 and 9. As before stated, the cylinder or drum is held in its elevated position by the engagement of the pawl 23 with the ratchet wheel 22. Suspended from the trunnion 11 and extending beneath the drum or cylinder 10 is a swinging tray 29 having a perforated or screen bottom and open at its forward side. The tray 29 may be suspended upon the trunnions 11 independent of the collars or stirrups 15 but is preferably attached to ears or lugs 30 extending from such collars or stirrups. The suspended tray 29 is raised and lowered in unison with the cylinder or drum. It sometimes happens in plating small articles or parts that such parts will be accidentally lost through the perforations or openings of the cylinder or the closure of the cylinder may be accidentally disengaged thereby discharging the contents into the bottom of the vat. The difficulty of recovering such lost parts is overcome by the present construction in which such parts would be deposited in the suspended tray 29 from which they are easily and readily recovered upon the elevation of the cylinder or drum

from the vat. The suspended tray 29 is also of material use in discharging the contents of the cylinder after the plating operation has been completed. After the cylinder has been elevated and the closure removed, the cylinder is rotated to cause the contents thereof to be discharged from the cylinder into the suspended tray 29 through the perforated bottom of which the electrolyte or plating fluid adhering to the parts is permitted to drain back to the vat. The discharge of the parts into the suspended tray before being removed from over the vat is of material assistance in draining the parts, especially when such parts have cavities or recesses in which the electrolyte may collect. To further facilitate the drainage of the plated parts there is provided a receiving tray 31 shown in detail in Fig. 5 which is adapted to be introduced beneath the suspended tray 29 and supported upon opposite sides of the vat or tank. The receiving tray 31 is preferably in the form of a chute contracted at its forward side to discharge the articles into a waiting container or receptacle. The bottom of the receiving tray is also formed of perforated material or screen, as indicated at 32, through which any excess of moisture may be drained from the plated articles back to the vat or tank. For conveniently supporting the receiving tray in position for ready use, it is normally suspended at the side of the tank or vat, as shown in Fig. 2, upon rollers 33 carried upon brackets 34 attached to the side of the vat. These rollers 33 engage in slots or guides 34 in the sides of the receiving tray. The upper edge of the side wall of the vat is cut away as at 35 to facilitate the insertion of the receiving tray. This recess 35 is normally closed by the upper end of the receiving tray 31 when the latter is in its normal or suspended position. However, when it is desired to empty the cylinder the receiving tray 31 is oscillated about the roller 33 upon which it rides easily and is pushed across the top of the vat until the rear end of the receiving tray rests upon the supporting bar 36 of the splash board 37 at the opposite side of the vat, as shown in Fig. 4. The plated parts, having been discharged from the cylinder into the suspended tray 29 for preliminary draining, are then discharged from the tray 29 into the receiving screen 31 by the oscillation of the tray 29 about the trunnion 11 as shown in Fig. 4. The successive discharges of the parts from the cylinder 10 to the tray 29 and from the tray 29 to the receiving tray 31 agitates and turns the plated parts thereby entirely emptying any recesses or chambers which may have contained electrolyte. The receiving tray 31 is then emptied by drawing it forward and inclining it about the rollers 33, as indicated by dotted lines in Fig. 4. It is obvious that

the suspended tray 29 may be omitted and the contents of the cylinder discharged directly therefrom into the receiving tray 31, or the receiving tray 31 may be dispensed with and the parts discharged from the suspended tray 29 onto a traveling belt or suitable chute or container by which they are conveyed away from the vat. At each side of the tank or vat are located longitudinally disposed bars or rails 36 which rest loosely upon the ledges or shelves 4—4 at the opposite ends of the vat. Attached to the bars or rails 36 and supported thereby in pendent position are splash boards 37 extending downward substantially to the fluid level of the tank. These splash boards and their supporting rails are readily removable. The splash boards extending in parallel relation with the sides of the tank form at each side of the drum space a compartment 38 through which extend in longitudinal directions electrical conductors 39. Suspended upon these conductors 39 are the anodes 40. The splash boards protect the electrical connections of the anodes from deposit and corrosion. In order that the splash boards 37 may be retained in position there are provided in the shelves or ledges 4—4 notches 41 in which the splash boards engage.

Without the use of the splash board 37 more or less plating fluid is dripped or splashed upon the electrical conductors 39 during the operations of raising the drum from the vat and returning it thereto. The evaporation of the electrolyte which may find lodgment upon the electrical conductor causes the conductor to become incrustated with a deposit of chemicals or salt and also causes the conductor to become corroded. Such deposit and corrosion prevents perfect electrical contact between the electrode connection and the conductor and so interferes with the plating current and reduces the efficiency of the apparatus. By the use of the splash board the electrical conductors are kept clean and in perfect working order, thereby insuring high efficiency. In Figs. 7 and 8 there is shown a modification of the hoisting connections to the drum in which the trunnions 11 of the drum are journaled in bearing blocks 42 slidably mounted in the grooves or recesses of the uprights 5 and standards 8. The hoisting cables 16 are connected directly to the bearing blocks 42. The pulleys or sheaves 17 at the upper ends of the standards 8 are offset outward as at 43 whereby the download of the cable will be sufficient within the recess or channel of the upright and standard. This construction will provide sufficient clearance to prevent interference between the cable and drum in the event that the cable is unduly slackened.

From the above description it will be apparent that there is thus provided a device

of the character described possessing the particular features of advantage before enumerated as desirable but which obviously is susceptible of modification in its form, proportion, detail construction or arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to certain structural features, it is to be understood that the means and construction herein described comprise but one mode of putting the invention into effect, and the invention is therefore claimed broadly in any of its possible forms or modifications within the scope of the appended claims.

Having thus described my invention, I claim:

1. In an electroplating apparatus, the combination of a vat having grooved recesses or channels in its inner opposite sides, standards projecting above the top edge of the vat having grooved recesses on their adjacent sides registering with and forming continuations of the grooved recesses or channels of the vat, a revoluble drum, trunnions projecting from said drum and engaging in said grooved recesses of the standards, and hoisting apparatus adapted to reciprocate the drum vertically within the limits of the combined grooved recesses.

2. In an electroplating apparatus, the combination of a vat, a revoluble drum therein, standards projecting above the level of the tank, sliding connections between the drum and standards, separate sheaves carried by the standards, cables passing over the sheaves and attached to the drum and winding means for said cables.

3. In an electroplating apparatus, the combination of a vat, a revoluble drum therein, hoisting cables attached to the drum, a separate winding drum for each cable, a shaft for each winding drum, an intermediate driving connection between said shafts for operating said shafts in unison, means for actuating the shafts and means for retaining the shafts in adjusted position.

4. In an electroplating apparatus, a vat, a revoluble drum therein, hoisting cables attached to the drum, a separate winding reel for each cable, and intermediate driving mechanism between the reels for operating the reels in unison, means for rotating the reels and retaining means for the reels in operated positions.

5. In an electroplating apparatus, a vat, a revoluble drum therein, a receiver suspended beneath the drum, and means for simultaneously lifting the drum and receiver from the vat.

6. In an electroplating apparatus, a vat, 130

a revoluble drum therein, trunnions upon which the drum is supported, a receiver suspended from said trunnions and hoisting apparatus for lifting the drum and receiver in unison.

7. In an electroplating apparatus, a vat, a revoluble drum therein, hoisting means for the drum and a reciprocatory receiver movable into and out of position intermediate the drum and vat when the drum is in its elevated position.

8. In an electroplating apparatus, a vat, a revoluble drum therein, hoisting means for the drum, and a draining receptacle forming a cover for said vat into which the contents of the drum are discharged, said draining receptacle being slidably connected to the vat for reciprocatory movement into and out of the path of the drum.

9. In an electroplating apparatus, a vat, a revoluble drum therein, hoisting means for the drum and a perforated cover deck for the vat movable into and out of a position intermediate the drum and vat when the drum is in elevated position.

10. In an electroplating apparatus, a vat, a revoluble drum therein, hoisting means for the drum, a receiver for the contents of the drum movable in unison with the drum and a second receiver for the contents of the first receiver movable into receiving position independent of the drum.

11. In an electroplating apparatus, a vat, a revoluble drum therein, hoisting means for the drum, and a plurality of receivers located above the level of the vat into the

first of which the contents of the drum are discharged, each receiver discharging into the next of the series, the drainage from the last receiver being returned to the vat.

12. In an electroplating apparatus, a vat, a revoluble drum therein, hoisting means for the drum, a receiver forming a removable false bottom for the vat adapted to receive articles deposited from the drum, and means for withdrawing the receiver from the vat in unison with the hoisting of the drum to enable the recovery of the deposited articles.

13. In an electroplating apparatus, a vat, a revoluble drum therein, hoisting means for the drum, a movable receiver for the contents of the drum, supports for said receiver about which it is both pivotally and slidably movable, said receiver being insertible beneath the drum when the drum is in elevated position and adapted to be suspended upon said supports when not in use.

14. In an electroplating apparatus, a vat, a revoluble drum therein, an electrical conductor extending through the vat, electrodes suspended upon said conductor, and a housing within the vat inclosing the conductor and electrode connections, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand this 4th day of April A. D. 1916.

FOREST H. HARTZELL.

Witnesses:

HARRY F. NOLAN,
CARRIE M. BECKER.